

PROJECT facts

U.S. DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY

Sequestration

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APPLICATION AND DEVELOPMENT OF APPROPRIATE TOOLS AND TECHNOLOGIES FOR COST-EFFECTIVE CARBON SEQUESTRATION

CONTACT POINTS

Scott M. Klara
Sequestration Product Manager
National Energy Technology
Laboratory
626 Cochran's Mill Road
P.O. Box 10940
Pittsburgh, PA 15236
412-386-4864
scott.klara@netl.doe.gov

John Litynski
Project Manager
National Energy Technology
Laboratory
3610 Collins Ferry Road
P.O. Box 880
Morgantown, WV 26507
304-285-1339
john.litynski@netl.doe.gov

Bill Stanley
The Nature Conservancy
4245 North Fairfax Drive
Arlington, VA 22201
703-841-5823
bstanley@tnc.org

TOTAL ESTIMATED COST

Total Project Value	\$2,065,425
DOE	\$1,652,340
Non-DOE Share	\$ 413,085

Background

According to the Intergovernmental Panel on Climate Change (IPCC), deforestation accounts for about 20 percent of annual global emissions of carbon dioxide (CO₂), the primary greenhouse gas (GHG). The IPCC estimates that 12 to 15% of the fossil fuel CO₂ emissions between 1995 and 2050 could be offset through slowing tropical deforestation, allowing these forests to regenerate, and engaging in plantation plantings and other forms of agroforestry.

There is great potential for such cost-effective carbon sequestration projects both in the United States and abroad. However, without the development and refinement of tools and technologies that allow accurate and cost-effective assessment of the amount of carbon sequestered, these approaches may not be recognized as a credible means for reducing GHG. Through the ongoing development and implementation of carbon sequestration projects on a demonstration scale, The Nature Conservancy is participating in a cooperative agreement with the Department of Energy to explore the compatibility of carbon sequestration in terrestrial ecosystems with the conservation of biodiversity. The Conservancy's first involvement in assessing this approach came in 1994 with the development of the Rio Bravo Carbon Sequestration Pilot Project in Belize, in cooperation with several partners. Since then, several other projects have been initiated with a variety of partners.

This project will focus on gaining cost-effective, verified measurements of the long-term potential of various terrestrial carbon sequestration strategies and assessing land use practices that avoid emissions of CO₂. The project will use newly developed aerial and satellite-based technology to study forestry projects in Brazil and Belize to determine their carbon sequestration potential and will also test new software models to predict how soil and vegetation store carbon at sites in the United States and abroad.

Primary Project Goal

The primary goal of this project is to refine the tools and methodologies for cost-effective, verified measurements of the long-term potential of various carbon sequestration strategies and assessing land use practices that avoid emissions of CO₂, using actual projects as proving grounds.



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PARTNERS

The Nature Conservancy (TNC)

Winrock International Institute
for Agricultural Development

The Society for Wildlife
Research (SPVS)

Programme for Belize

Comite de Defensa de la Fauna
y Flora (CODEFF)

Universidad Austral de Chile

Los Alamos National
Laboratory

Colorado State University

Stephen F. Austin State
University

Virginia Technical University

ADDITIONAL SUPPORT

American Electric Power
General Motors
Texaco

CUSTOMER SERVICE

800-553-7681

WEBSITE

www.netl.doe.gov

Objectives

- Improve carbon monitoring and lower its cost
- Develop land use trend models to project potential CO₂ offsets
- Evaluate and standardize carbon monitoring methods and procedures
- Assess domestic land-use options for reducing greenhouse gases
- Develop software for initial feasibility screening of potential domestic projects.

Accomplishments

Advanced videography has been applied for pine savannah analysis in Belize. Feasibility studies on several different U.S. ecosystems have been initiated to determine for which of these ecosystem types carbon sequestration is a viable option. The GEOMOD spatial analysis tool has been used to determine and validate baseline analyses. An alternative baseline method developed by TNC, called the Euclidean Distance between Agriculture and Forest (EDAF) method, has been further refined in baseline analyses in Brazil. A technical advisory panel was organized to address the issues associated with baseline and leakage estimates. In addition, soil monitoring is being conducted using laser-induced breakdown spectroscopy (LIBS), being developed by the Los Alamos National Laboratory.

Benefits

This project is very important because it is validating technology and developing protocols to measure carbon both in soils and in above ground vegetation. Although most of the sites being surveyed are in South America, the technology is easily transferable to other areas.

Examples of interpretation of sub-vegetation types within 1 ha "plots" in the Pine-Savanna Vegetation in the Rio Bravo Carbon Sequestration Pilot Project Using Digital Aerial Imagery to estimate the carbon stocks.



Designing a destructive sampling protocol for a heterogeneous landscape. Guaraqueçaba Climate Action Project, Paraná, Brazil.

